

## CLAIMS

What is claimed is:

1. A hydraulic coupling system, comprising
  - a pump;
  - a controller;
  - a clutch assembly including an actuator and a multi-disk clutch pack coupled to the actuator, the pump pressuring a fluid in the actuator to engage the clutch pack and pumping the fluid through the clutch pack to cool the clutch pack under the direction of the controller;
  - and
  - a valve for maintaining the fluid pumped to the actuator at a higher pressure than the pressure of the fluid pumped through the clutch pack to cool the clutch.
2. The system of claim 1 wherein the valve is pulse width modulated under the direction of the controller.
3. The system of claim 1 wherein the pump is pulse width modulated under the direction of the controller.

4. The system of claim 1 further comprising a two-way valve which provides a preload pressure to the system when the pump is not operating and the clutch pack is disengaged.
5. The system of claim 1 further comprising a pilot valve which provides a preload pressure to the system when the pump is not operating and the clutch pack is disengaged.
6. The system of claim 1 further comprising an accumulator for compensating for fluid leakage in the system.
7. The system of claim 1 wherein the pump is a gerotor, vane or gear pump.
8. The system of claim 1 further comprising a hypoid shaft and a propeller shaft, the hypoid shaft and the propeller shaft being coupled through the clutch assembly.
9. The system of claim 1 further comprising an axle gear coupled to the clutch assembly, the axle gear being supported by two opposing tapered-roller bearings, and a housing, wherein the clutch assembly,

axle gear, and bearings are an integrated unit incorporated in the housing.